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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/604,533

07/29/2003

Joachim Nuetzel

FIS920020132US1

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08/08/2006

EXAMINER

MITCHELL, JAMES M

CANTOR COLBURN LLP - IBM FISHKILL
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,533

Applicant(s)

NUETZEL ET AL.

Examiner

James M. Mitchell

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,10 and 14 is/are rejected.
- 7) ☒ Claim(s) 2-4,6-9,11-13 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to applicant's amendment filed March 27, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5, 10 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Parks et al. (U.S. 2005/0036399).

Parks (Fig. 7-9) discloses:

(cl. 1, 10) a method of forming an interconnect structure in a magnetic random access memory (MRAM) device, the methods comprising: defining a magnetic stack layer (142) on a lower metallization level (141b), said magnetic stack layer including a non-ferromagnetic layer (143) disposed between a pair of ferromagnetic layers (144,142); defining a conductive hard mask (145; Par. 0041) over said magnetic stack layer; and removing portions of said hardmask and said stack layer (Fig. 7-8), thereby creating an array of magnetic tunnel junction (MTJ) stack including remaining portions of the stack and hard mask; wherein the hardmask forms self aligning contact between said stack layer and an upper metallization level subsequently formed above said MTJ stack (150); (cl. 5, 14) wherein said hardmask is tantalum (Par. 0041).

Claims 1, 5, 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Kishi et al. (U.S.2005/0078417).

Kishi (Fig. 34A-35B, 36A-37B) discloses:

(cl. 1, 10) a method of forming an interconnect structure in a magnetic random access memory (MRAM) device, the methods comprising: defining a magnetic stack layer (see lower layer 173, not labeled; Par. 0127) on a lower metallization level (172), said magnetic stack layer including a non-ferromagnetic layer disposed between a pair of ferromagnetic layers; defining a conductive hard mask (174) over said magnetic stack layer; and removing portions of said hardmask and said stack layer (Fig. 34A-36A), thereby creating an array of magnetic tunnel junction (MTJ) stack including remaining portions of the stack and hard mask; wherein the hardmask forms self aligning contact between said stack layer and an upper metallization level subsequently formed above said MTJ stack (172);

(cl. 5, 14) wherein said hardmask is tantalum (Par. 0150);

Allowable Subject Matter

Claims 2-4, 6-9, 11-13 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: while forming holes in insulation layers are known to connect to MTJ as

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evidenced by for example Okazawa et al. (U.S 2002/0155627), the prior art fails to disclose or make obvious forming holes in an insulation over a MTJ including a hardmask and cap, wherein the cap is removed and an upper metallization is formed connected to the MTJ through the conductive hardmask including all the limitations of the independent claim.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection .

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art discloses the use of forming MTJ stack including a mask, and the use of interconnecting MTJ stacks to an upper metallization level.

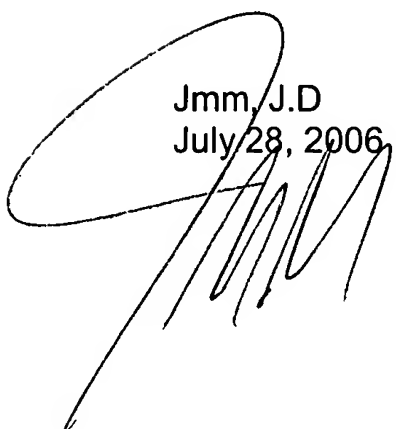
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jmm, J.D.
July 28, 2006




CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800